

# GNS

English Edition

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The Corporate Magazine of the GNS Group



**Portfolio Completed**  
GNS Takes Over  
Eisenwerk Bassum

**Taiwan Relies on GNS**  
Development of Five  
Cask Types

**Largest Foreign Project Completed**  
Last CONSTOR®  
Delivered to Ignalina



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Basket for cut RPV internals from dismantling at Unterweser NPP (see article on page 8/9).

## News

# GNS Trainees Win “Security Right from the Start!”

The “VISION ZERO – Security right from the start!” trainee competition lasted nine months, from which the three GNS trainees Andreas Dudlitz, Sarah Wehrmeister and Lisa Kulbatzki emerged victorious as participants of the individual challenge in a mixed team of trainees from GNS Gesellschaft für Nuklear-Service mbH, Bayernoil Raffineriegesellschaft mbH and KG Deutsche Gasrußwerke GmbH & Co. At the end of June 2019, 110 trainees from member companies of the German Social Accident Insurance Institution for the raw materials and chemical industry (Berufsgenossenschaft Rohstoffe und chemische Erzeugnisse – BG RCI) spent two days competing for victory in Willingen, Sauerland.



The proud winners from the left: Lisa Kulbatzki, Andreas Dudlitz, Sarah Wehrmeister. Meanwhile two of them have completed their training and have been hired permanently by GNS.

The individual challenge focuses specifically on companies with fewer than ten trainees. More than 500 trainees initially took part in an Internet competition.

For a period of one month, 30 questions had to be answered weekly with a time limit of 20 seconds per question. The

30 trainees with the best results were invited to the nationwide final in Willingen. There, they competed in three randomly selected teams at the end of June. During the two-day final, various questions on topics such as “Dangers of falling”, “Healthy eating” or “Tools and machines” had to be answered in quiz rounds.

The BG RCI trainee competition is part of the BG RCI prevention strategy entitled VISION ZERO. VISION ZERO is the vision of a world without work accidents and work-related illnesses. Top priority is given to the prevention of fatal and serious accidents at work and occupational diseases. The goal of Vision Zero is a comprehensive prevention culture. For further information about the competition:

[www.bgrci.de/azubi-wettbewerb/sicherheit-von-anfang-an/](http://www.bgrci.de/azubi-wettbewerb/sicherheit-von-anfang-an/)

# Editorial



**Dear readers,**

The global corona crisis also has various effects on our company. As always in nuclear technology, also in these challenging times for all of us, our attention is first and foremost focused on the health of our own employees and those of our customers. As well as the distance requirement already familiar to us from radiation protection, we also do everything else to protect the health of our employees and to maintain the ability of our company and our customers to act.

So far, we have largely succeeded in this but not everything is up to us: This spring, we wanted to repatriate six CASTOR® casks with high-level radioactive waste from the reprocessing of German fuel assemblies in England to the Biblis interim storage facility in Germany on behalf of the German utilities. Together with several partner companies, the preparations that had been running intensively for many months were practically complete: The CASTOR® HAW28M casks were loaded and ready for transport to the English port, where the ship was already waiting for the passage to Germany. But then things turned out quite differently because, according to the police authorities responsible for escorting and

executing the transport in Germany, the police operation could not be justified in view of the increasing “spread of the corona virus”. So the return transport was cancelled again at short notice. It is still uncertain today when the transport can take place. Only one thing is certain: Postponed is not cancelled! The obligation to take back the waste will, of course, continue to apply. Let’s keep our fingers crossed that circumstances will allow us to carry out this first of a total of three transports from Sellafield as soon as possible.

Fortunately, in contrast to the repatriation projects, our other cask and waste management business has hardly been affected by the corona crisis so far:

After we joined the nuclear technology specialists Höfer & Bechtel last year, we have again decisively strengthened our portfolio with the acquisition of our long-standing partner Eisenwerk Bassum at the beginning of this year. In addition to the well-known CASTOR® and MOSAIK® casks for high and intermediate-level radioactive waste, it now also includes the containers required in particularly large quantities for final disposal of the waste volumes that arise from decommissioning. Whether operation or dismantling, we provide the necessary containers and casks for transport, interim storage and final disposal.

And this applies not only to our German customers: Based on the proven EWB steel sheet containers, the GNS SBoX® and the associated packaging technology, together we succeeded in winning the contract in an international tendering procedure of Taiwan Power Company for the development of casks for intermediate- and low-level radioactive waste from the upcoming national decommissioning projects. The fact that we are not only able to design and build containers, but are also very familiar with the dismantling and packaging of

reactor pressure vessels (RPVs) and their internals was also of benefit to us in this tender.

Two years ago, we led a consortium that was awarded the contract to dismantle and package the RPV internals of all six PreussenElektra plants. And just recently – now together with Höfer & Bechtel – we also won an order from PreussenElektra for dismantling and packaging the six reactor pressure vessels themselves. In total, GNS is involved in dismantling eight RPVs and their internals and is thus one of the leading dismantling specialists in Germany.

Our processing and packaging solutions – and, in many cases, our personnel – are deployed at all other power plant locations in Germany as well. So there is a lot for us to do – during decommissioning as well as for the power plants still in operation in Germany and increasingly also far beyond. In order to gain further ground in Asia, we have entered into a distribution partnership with ITOCHU for the Japanese market and developed the CASTOR® geo26JP for the requirements of the PWR operators there. These are just a few highlights of the past months. These and many other topics related to safe nuclear disposal are covered in this GNS Magazine.

And, above all: Please stay healthy.

Dr. Hannes Wimmer  
Chairman of the Board  
of Managing Directors

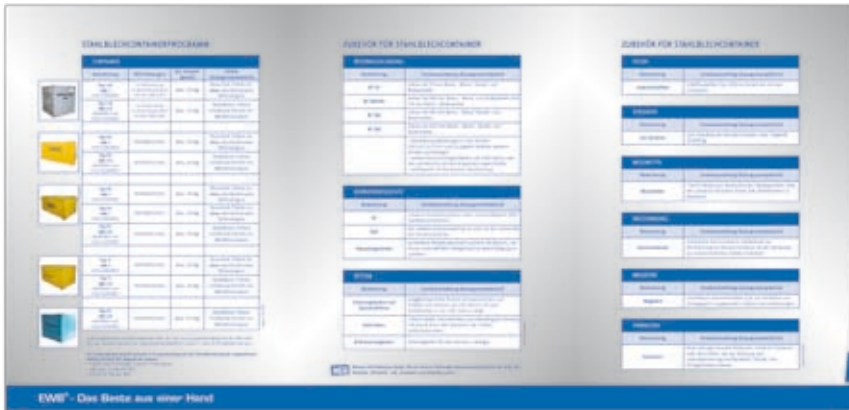
Acquisition of Eisenwerk Bassum GmbH

# Eisenwerk Bassum Completes the Container Portfolio of the GNS Group

GNS has always offered the casks and containers required for the transport, storage and, in some cases, final disposal of intermediate and high-level radioactive waste. The casks of the CASTOR® and MOSAIK® series form the backbone of nuclear disposal in Germany and far beyond. With the takeover of Eisenwerk Bassum GmbH GNS Group's portfolio now also includes steel sheet containers that are required for the packaging and final disposal of the particularly large waste quantities from dismantling.



Signing of the contract on 21st February 2020: Front row from the left: Dr. Jens Schröder, Hartmut Grunau, Edda Beckedorf, Georg Büth. At the back from the left: Dr. Carsten Heuel (Kanzlei Ahlers & Vogel), Christoph Kohn, Dirk Schlauch.



Eisenwerk Bassum GmbH (EWB) is the only manufacturer to offer all steel sheet containers of types II – VI approved for final disposal in the German final repository Konrad. The product range also includes other waste and special containers, load carriers and services in the field of plant and mechanical engineering. GNS and EWB have been working together intensively on container and technology projects for many years.

**Corporate image, workforce and both EWB locations remain unchanged**

On 21st February 2020, GNS acquired 100 percent of EWB. The company with its 106 employees at the Bassum and Peenemünde locations will continue to provide the proven supplies and services as an independent GmbH under the name of Eisenwerk Bassum. The previous owners, Edda Beckedorf and Hartmut Grunau, remain active in the company.

“Eisenwerk Bassum GmbH will be strengthened in view of the

numerous development and approval procedures that are still required, and the ability to supply all customers will be further secured”, explained Hartmut Grunau, now Technical Managing Director of EWB, on the occasion of the signing of the contract. Georg Büth, Commercial Managing Director of GNS and now also of EWB, added: “Our aim is to continue the reliable cooperation with all existing customers. The internationalisation of GNS will open up opportunities for Eisenwerk Bassum GmbH and all its employees to develop further markets in Europe and beyond.”

A first joint international success can already be announced: Based on the proven EWB steel sheet containers, the GNS SBoX® and the associated packaging technology, GNS succeeded in winning the contract for the development of containers for intermediate and low-level radioactive waste from the upcoming national dismantling projects in an international tendering

procedure of Taiwan Power Company (see page 7).



“Nordlicht project”: Memento for everyone involved in the takeover project.

First “Class ISS” certification for cask assembly internals worldwide

# GNS, the Eleventh Company Worldwide to Hold ASME N3 Certification

After successfully undergoing a rigorous survey, GNS has earned the “Certificate of Authorisation N3” from the “American Society of Mechanical Engineers” (ASME). A team of about fifty GNS employees has been involved with the preparations for the audit in the eighteen months leading up to it. This certificate of authorisation enables GNS as one of originally only eleven companies worldwide, to design, test, fabricate, inspect and deliver “Class TC” transport casks and “Class SC” storage casks using the certification mark. GNS is the first company ever to have earned certification for compliance with Class ISS (Internal Support Structures) requirements for internals (such as baskets and quivers) in accordance with the ASME Boiler and Pressure Vessel Code (BPVC).

GNS having attained certification from ASME confirms that the quality management systems in place at GNS have helped effectively implement measures to meet the requirements set out in Section III (Construction of Nuclear Facility Components) pursuant to the ASME BPVC and the Quality Assurance Requirements for Nuclear Facility Applications (NQA-1). There are many countries where quality assurance requirements are based on the NQA-1 quality management system and in several Asian countries, such as Taiwan, Korea and Japan, this quality assurance system has been fully incorporated.

“While our German and numerous European customers have adopted a quality management system that complies with ISO 9001:2015, other international customers increasingly rely on

rules and regulations that are based on US standards”, explains Dr. Jens Schröder, Technical Managing Director of GNS. “As an ASME N3-type certificate holder, we are now in a position to further explore other international markets where this type of certified compliance enables us to meet the product requirements of new customers.”

The qualification of the GNS supply chain according to NQA-1 will also be expanded further. Step by step, suppliers are being qualified under the “Commercial Grade Dedication” process according to NQA-1 and can thus be commissioned for NQA-1 projects such as the CASTOR® geo26JP or the IP-2 steel sheet containers for Japan (see page 10/11) and the casks for Taiwan (see page 7).

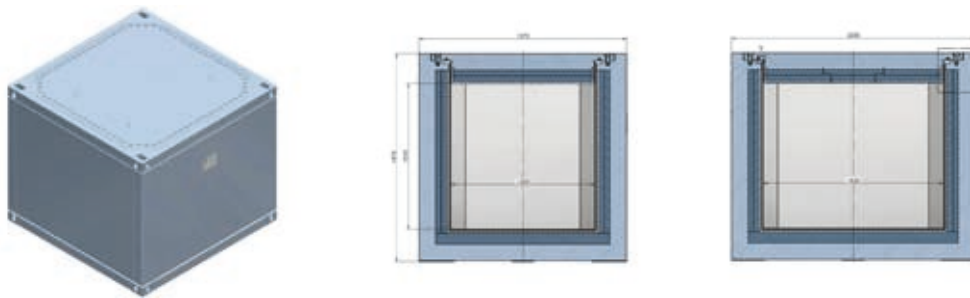


The ASME code is currently the world’s leading set of rules and standards for the construction, manufacture and testing of pressure equipment and pressurised components. Components fabricated according to this code are accepted and used as being compliant with technical rules and standards in well over 100 countries around the world. There is a set of 600 rules and standards set forth by the ASME BPVC. The ASME Nuclear Quality Assurance (NQA-1) certification programme offers central and independent certification through a third party for quality assurance programmes that comply with the ASME NQA-1 standard “Quality Assurance Requirements for Nuclear Facility Applications”. This includes comprehensive auditing of the quality assurance programme by qualified, seasoned ASME auditors with extensive experience in quality assurance.

Development of casks for Taiwanese nuclear power plants

# Taiwan Relies on GNS Containers for Dismantling

Following an international tender procedure, GNS has been awarded a contract by Taiwan Power Company (TPC) for the development of containers for the transport and interim storage of intermediate and low-level radioactive waste. This project is the first contract awarded internationally by TPC as part of the upcoming national decommissioning projects. The containers are required for waste from the dismantling of reactor pressure vessels (RPVs) and their internals from all Taiwanese nuclear power plants.



With a planned duration of four years, the project comprises the development of a total of five container types (1x type B(U), 4x IP-2) and the fabrication of one test sample of each cask type for tests. The containers are largely based on the existing GNS SBoX® (Type B(U)) and steel sheet containers (IP-2).

Edward H.C. Chang, Director of Nuclear Backend Management Department at TPC: “During the open tender process GNS convinced Taipower with their experienced packaging solutions and their proven technology, which are believed as reliable and efficient. We expect that through this bilateral cooperation, Taipower will achieve the localization of container’s mass production in the future.”

In fulfilling this contract, GNS will cooperate closely with Eisenwerk Bassum (EWB, see also page 4), which will produce the test samples among other things. The design, fabrication and tests accompanying fabrication will largely be carried out according to ASME (see also page 6).

The scope of supply comprises the complete handling and loading equipment, the preparation of a preliminary plan for cutting the internals and the RPV as well as the application documents for the approval of the cask types as type B(U) or

IP-2 packaging. The order also includes five initial samples that are already to be produced by local partner companies in Taiwan, training in the handling, loading and processing of the containers as well as the cold trial at the Chinshan power plant.



The Taiwan Power Company is a state-owned company, established in 1946 and based in Taipei, under the control of the Ministry of Economic Affairs (MOEA). TPC is the operator of Taiwan’s nuclear power plants. There are three power plant locations, each with two blocks. The current Taiwanese government aims to phase out nuclear energy by 2025. The two SWR blocks, Chinshan 1 & 2, were finally shut down in the summer of 2019. The Kuosheng 1 & 2 BWR blocks are to be shut down between 2021 and 2023 and the Maanshan 1 & 2 PWR blocks between 2024 and 2025.

Dismantling of all reactor pressure vessels

# Another Major Dismantling Order from PreussenElektra

The GNS Group has received an order from PreussenElektra (PEL) for dismantling the reactor pressure vessels (RPV) of its entire nuclear power fleet. The GNS-led ReaDi (“Reactor Dismantling”) project comprises the complete dismantling and repository-compatible packaging of the six pressure vessels, each weighing between 400 and 500 tons, the heart of a nuclear power plant. The total estimated duration of the project is ten years.



Sitting in front from the left: Dr. Guido Knott (PEL), Dr. Hannes Wimmer (GNS). At the back from the left: Boris Westerwinter (GNS), Frank-Swen Sauer, Lars Schulze (PEL), Sascha Bechtel (Höfer & Bechtel), Florian Seyler (PEL), Dr. Jürgen Skrzypppek (GNS), Uwe Altman, Dr. Ulf Klostermann (PEL).





ZerKon project: Underwater cutting of a control rod guide tube in the Unterweser nuclear power plant.



Höfer & Bechtel GmbH, in which the GNS Group has held a majority stake since last year, will take over the actual dismantling of the reactor pressure vessels while, as a specialist in the field of waste disposal, GNS itself will be responsible not only for project management but also for the repository-compatible packaging of the dismantled components. The two companies are supported by the GNS subsidiary WTI Wissenschaftlich-Technische Ingenieurberatung GmbH.

“We need experienced and proven partners also for this project, which is strategically important for decommissioning. Both companies have already shown that they have the necessary competence and experience in implementing complex and sensitive projects”, explained Dr. Guido Knott, PreussenElektra Managing Director responsible for decommissioning and dismantling, on the occasion of the contract award. “With the acquisition of Höfer & Bechtel last year, we have consistently strengthened our position to meet the challenges of the upcoming dismantling projects”, adds Dr. Hannes

Wimmer, CEO of GNS. “This order from PreussenElektra underscores our leading role in the dismantling of Germany’s nuclear power plants.”

For GNS, this is not the first order from PreussenElektra’s decommissioning activities: Two years ago, the GNS-led consortium with Westinghouse called ZerKon, was awarded the contract for dismantling and packaging the reactor pressure vessel internals of the six PEL nuclear power plants (see GNS Magazine 11/2019). “After the disposal of the RPV internals, we will seamlessly continue the dismantling of the reactor pressure vessels”, explains Boris Westerwinter, group leader for dismantling and major projects at GNS responsible for the two PEL projects. “This offers a high synergy potential, as we are already very familiar with all the boundary conditions and circumstances.”

**Dismantling of the RPV internals at KKKU has already begun**

At the Unterweser power plant (KKU), the dismantling of the RPV internals

in February 2020 marked the beginning of the first major dismantling operation. First, the control rod guide tubes were detached from the upper core support structure and then cut into repository-compatible pieces using an underwater scrap shear. The internals in the RPV mainly comprise items of equipment that have fixed the fuel assemblies in place in the vessel and ensured the flow of coolant. The internals are dismantled remotely under water for reasons of radiation protection.

“Disassembling and packaging these internals represent one of the most technically demanding and complex projects of dismantling. The successful (i.e. safe and timely) implementation is of enormous importance for each individual power plant in order to comply with the decommissioning plan”, confirms Dr. Guido Knott. The project at KKKU serves as a pilot for the other nuclear power plants of PreussenElektra GmbH and is scheduled to run for almost two years.

CASTOR® and plant technology for the Japanese market

# GNS in 日本\*

\*GNS in Japan

GNS is developing a series of casks especially for the Japanese market – the CASTOR® geo26JP.



Signing the contract in Tokyo: Dr. Linus Bettermann, Dr. Jürgen Skrzypek and Dr. Hannes Wimmer (GNS) together with Kenji Seto (President, ITOCHU Minerals & Metals Company), Oasamu Tano (General Manager, ITOCHU Coal & Nuclear Fuel Department) and Yoshitaka Kanemitsu (Section Manager, ITOCHU Nuclear Fuel Section).

The CASTOR® geo26JP is designed as a dual-purpose cask for the storage and transport of up to 26 PWR fuel assemblies from Japanese nuclear power plants. In order to obtain approval for the Japanese market, the application to the Nuclear Regulatory Authority (NRA) in Japan is currently being prepared.

GNS is supported by the Japanese partners Nuclear Fuel Transport (NFT) and ITOCHU Corporation. NFT is approximately 70 percent-owned by the Japanese utilities and offers comprehensive expertise in the field of spent fuel transportation.

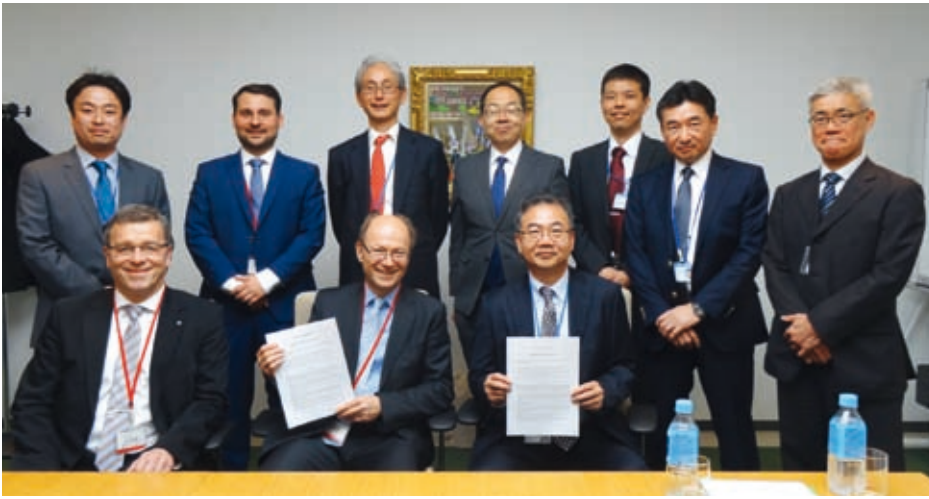
For the sales of GNS spent fuel casks on the Japanese market, GNS concluded an exclusive distribution partnership with ITOCHU in November of 2019. ITOCHU Corporation is one of Japan's largest trading companies with an annual turnover of approximately US\$ 44 billion and a workforce of more than 100,000. As part of its long-standing commitment to the Japanese nuclear industry, ITOCHU is now also offering its customers GNS casks for fuel assemblies from pressurised and boiling water reactors. The sales partnership has initially been concluded for ten years, with the contract to be

extended by a further ten years if the cask marketing is successful.

### Successful acceptance of GNS plant engineering in Japan

As already reported in the last GNS Magazine, in February 2018 GNS received an order from the Japanese company NGK Insulators Ltd. for the development, fabrication, delivery and commissioning of a test facility in Japan.

The plant adjusts a defined mixture of spherical or powder resins with water



Cooperation between NGK and GNS: Yohei Mitsuno, Jörg Viermann, Martin J. Hoffmann, Ryohei Iwasaki, Dr. Jürgen Skrzyppek, Hitoshi Ohata, Masanobu Inoue, Takahiro Oike, Kengo Nakada, Masanori Kanda (from the left).

and conveys it into the customer's hydro-pyrolysis reactor using a rotary valve developed by GNS. A second plant section removes the ash below the reactor by means of a temperature-resistant rotary valve and fills it into 10-litre drums. These are fed and transferred via a transfer system and then fully automatically capped.

After the Factory Acceptance Test (FAT) in December 2018, the plant was packaged and shipped by sea in February to NGK's Chita location where it was assembled and commissioned

by two GNS engineers. The training of the future operating personnel was conducted in parallel. After extensive functional testing and performance verification, the plant was accepted by NGK in April of 2019 as part of the final Site Acceptance Test (SAT).

**Cooperation for development and distribution**

NGK and GNS had already concluded a cooperation agreement in 2018 for the further development and distribution of the conditioning facility on the

Japanese market. Since then, the two teams from Germany and Japan have been working closely together in development. Also in April of 2019, NGK and GNS entered into an additional cooperation agreement with the aim of jointly distributing the FAFNIR and NEWA conditioning facilities developed by GNS on the Japanese market. Potential Japanese power plant customers will thus be able to temporarily store spent resins until the repository-compatible conditioning by means of a hydro-pyrolysis reactor is available.



Tsubaki Ozaki, Jan Seewald, Yohei Mitsuno, Masanori Kanda, Martin J. Hoffmann, Tadashi Hosoi, Takahiro Oike (from the left).



Commissioning at the customer site.

The last of the 191 CONSTOR® RBMK1500/M2 delivered to Ignalina

# Largest Foreign Project of GNS Completed

15 years after the start of the “Ignalina Project” in 2005, the goal has been reached: On 24th February 2020, the last of the 191 CONSTOR® RBMK1500/M2 casks was delivered to the Lithuanian Ignalina nuclear power plant (INPP). GNS has developed the cask type CONSTOR® RBMK1500/M2 as safe packaging for the spent RBMK-1500 fuel assemblies during the interim storage period of about 50 years. The casks are stored in an interim storage facility for spent fuel in the immediate vicinity of the power plant, which was constructed by a consortium consisting of the German NUKEM Technologies GmbH and GNS. The shutdown of the two formerly most powerful nuclear reactors in the world at Ignalina was a prerequisite for Lithuania’s entry into the EU in 2004. The project was financed from the resources of the International Decommissioning Support Fund for Ignalina, which is managed by the European Bank for Reconstruction and Development (EBRD).



View into the full Interim Spent Fuel Storage Facility (ISFSF) in Ignalina: The CONSTOR® casks with additional protection plate are already loaded.



Acceptance of the last, still unloaded cask no. 191 in the INPP storage facility with INPP project manager Sergej Pshechuk and GNS site manager Vladimir Penkov.

The successful partnership of GNS and INPP has lasted even longer, namely 25 years now. GNS received first orders for the supply of interim storage casks during the operating phase of the power plant. Between 1995 and 2010, GNS delivered a total of 118 casks for the storage of irradiated fuel assemblies from the power plant blocks still running at the beginning. These 20 casks of the CASTOR® RBMK type and 98 of the CONSTOR® RBMK type are also stored on the power plant site.

In order to meet the increased demands on cask capacity due to the shutdown of the second reactor block, GNS had modified the proven CONSTOR® RBMK cask. While the initial model could hold 102 fuel assemblies, the successor CONSTOR® RBMK1500/M2 holds 182. INPP initially ordered 190 casks together with the necessary handling equipment; a further cask was added later. Like its predecessor, the CONSTOR® RBMK1500/M2, which weighs more than 90 tons empty, has a sandwich cask body.

A 26 cm thick special concrete filling is placed between two 4 cm thick steel plates. After loading in the power plant,

each cask is closed with three lids, the first of which is already installed and bolted in the pool after loading (primary lid). The other two lids (sealing plate and secondary lid) are welded to the cask to form a double sealing barrier.

#### **More than three quarters of the casks already loaded and stored**

The approximately 2,370 m<sup>2</sup> Interim Spent Fuel Storage Facility (ISFSF) is located in the immediate vicinity of the power plant. Here, the irradiated RBMK fuel assemblies are to be stored safely for the next approx. 50 years. The ISFSF was officially inaugurated (see GNS Magazine 9/2016) on the occasion of the emplacement of the first loaded cask on 14th October 2016. Eight reference loadings took place under the supervision of GNS experts between September 2016 and the end of March 2017. Among other things, proof of the contractually agreed functional guarantee “loading of a cask every 18 calendar days” was provided in parallel in both blocks and accepted by the customer. After the Lithuanian safety authority VATESI granted the “Industrial Operation Licence” for the serial loading, dispatching and storing of the casks in May 2017, routine

was soon established, remembers Daiva Kühne, GNS Project Manager for Ignalina for more than ten years: “The loading team of the power plant is now so well coordinated that one cask per week can be processed. INPP has thus succeeded in loading and storing 145 casks within just three years. This is how reliably our CONSTOR® casks are processed in series.”

#### **CANs from Höfer & Bechtel**

If things continue at this pace, the last of the casks can be loaded and stored with regular fuel assemblies next year. The loading pools in both blocks will then be converted in order to load also the damaged fuel assemblies into special CONSTOR® RBMK1500/M2 casks. For this purpose, GNS has developed two special fuel baskets that can hold thirty-six fuel assemblies or ten damaged ones. These damaged fuel assemblies are first sealed in canisters known as CANs that are supplied by Höfer & Bechtel together with other equipment for processing, and then placed individually in the loading positions of the fuel basket. After loading all the casks, a total of more than 300 loaded GNS spent fuel casks will then be stored in Ignalina.

Last CASTOR® 1000/19 delivered

# Temelín Project: Order Completed

It was one of the top news items in the very first GNS Magazine in 2007: The conclusion of the supply contract with the Czech utility České Energetické Závody, a.s. (ČEZ) for casks of the type CASTOR® 1000/19 to be newly developed, which was won in an international tender. The casks were to be designed for transport as well as for up to 60 years of dry interim storage of 19 spent fuel assemblies each from the two Russian-type VVER pressurised water reactors of the Temelín nuclear power plant. The delivery of the 48th and last cask at the end of last year now fully completed this demanding project.



CASTOR® 1000/19 casks at the Temelín on-site interim storage facility of the Czech nuclear power plant.



September 2010: The first CASTOR® 1000/19 in the interim storage facility.

In December 2019, 14 years after the start of the Temelín project in 2006, the last CASTOR® 1000/19 cask left GNS cask production in Mülheim for the Czech Republic. In 2006, ČEZ initially ordered 35 casks including the necessary equipment, and then increased the total quantity by 13 casks in 2013. On 18th December 2019, the customer now accepted the complete contractually agreed scope of delivery of 48 casks including handling, processing and transport equipment.

### Extensive equipment and comprehensive training

The purchase order included all the equipment required for processing in the two power plant blocks, internal transport and emplacement of the casks in the new interim spent fuel storage facility. This comprised, for example, camera technology and equipment for de-watering and drying the cavity of the cask, including the filter section, and for testing the tightness of the lid sealing barriers. For handling inside the two reactor blocks and in the interim storage facility, lifting beams, lifting equipment and work platforms were to be supplied as well as two

new transport vehicles for internal cask transport. For the interim spent fuel storage facility, a cask monitoring system for monitoring the leak-tightness of the stored casks was provided and put into operation.

In addition, the contract also comprised the training of the ČEZ personnel in handling the GNS equipment. Training measures lasting several weeks were carried out for this purpose at the German GNS facility in Mülheim by GNS personnel experienced in cask processing. The cold handling operations in both blocks and the first cask loading were also supervised by GNS.

### Type approval and first loading after less than four years

After around two years of development and an assessment period of 19 months, the Czech approval authority SÚJB issued the type approval for the new cask on 21st June 2010. In a record-breaking time of less than four years after the start of the project, the first cask of the CASTOR® 1000/19 type was loaded in September 2010 and stored in the newly built interim storage facility on 10th September.



2010: Training of ČEZ-personnel at the GNS manufacturing facilities in Mülheim.

Since then, cask production at GNS as well as the loading, processing and storage in Temelín have been running like clockwork. By the end of 2019, 42 casks had already been loaded and dispatched. The last CASTOR® 1000/19 is expected to be loaded and dispatched in the middle of this year.



2007: The original report from the first GNS Magazine.

Contract concluded for the supply of two casks

# CASTOR® MTR3 for Helmholtz-Zentrum Berlin

In December 2019, the BER II research reactor of Helmholtz-Zentrum Berlin (HZB) was finally shut down after 46 years of operation. A total of 66 MTR-type fuel assemblies were irradiated during this period. HZB has commissioned GNS to supply two CASTOR® MTR3 casks to bring them from Berlin to the interim storage facility in Ahaus and store them there. Delivery of the casks is scheduled for the second half of 2022.



GNS has developed the CASTOR® MTR3 that already has approval for the inventories from the FRM II research reactor of the Technical University of Munich, especially for spent fuel assemblies from research reactors. In March 2020, the application for the extension of the approval under traffic law to also include fuel assemblies of the BER II research reactor of HZB has been submitted to the German approval authority.

The revision of the approval is necessary due to the different fuel assemblies: While five KKE7-type fuel assemblies are loaded at the Technical University of Munich, the fuel basket designed for the HZB holds 33 MTR fuel assemblies.

## Acceptance of the first CASTOR® MTR3 for TU Munich

Also in March, the BAM expert accepted the first CASTOR® MTR3 series cask at the GNS plant in Mülheim. The cask is the first of eight MTR3 casks manufactured for TU Munich. It will first be tested at FRM II during a cold trial and then be loaded probably later this year.



Johannes Graf and Diana Romanowski (GNS) with Dr. Stephan Welzel, Dinesh Singh and Dirk Höcker (HZB).



Contracts concluded with RWE Nuclear and PreussenElektra

# More than 100 CASTOR® Casks Ordered in Germany



## **CASTOR® V/19 for Grohnde and Brokdorf**

At the beginning of 2020, GNS received an order from PreussenElektra GmbH for the delivery of a total of 62 transport and storage casks of type CASTOR® V/19. The casks – Brokdorf will receive 39, Grohnde 23 – will be used for the disposal of spent fuel assemblies from the two pressurised water reactor nuclear power plants that will remain in operation until the end of 2021.

“With this large order, we are securing the largest share of the CASTOR® casks required for the disposal of irradiated fuel elements from our nuclear power

plants in Brokdorf and Grohnde”, explains Lothar Mertens, Head of Fuel Cycle and Interim Storage at PreussenElektra GmbH. “This gives us planning security at both sites and allows us to secure disposal at an early stage until the two plants are completely free from fuel.”

The casks are to be delivered from the GNS facility in Mülheim to the two power plants from mid 2022.

## **The last casks for Gundremmingen**

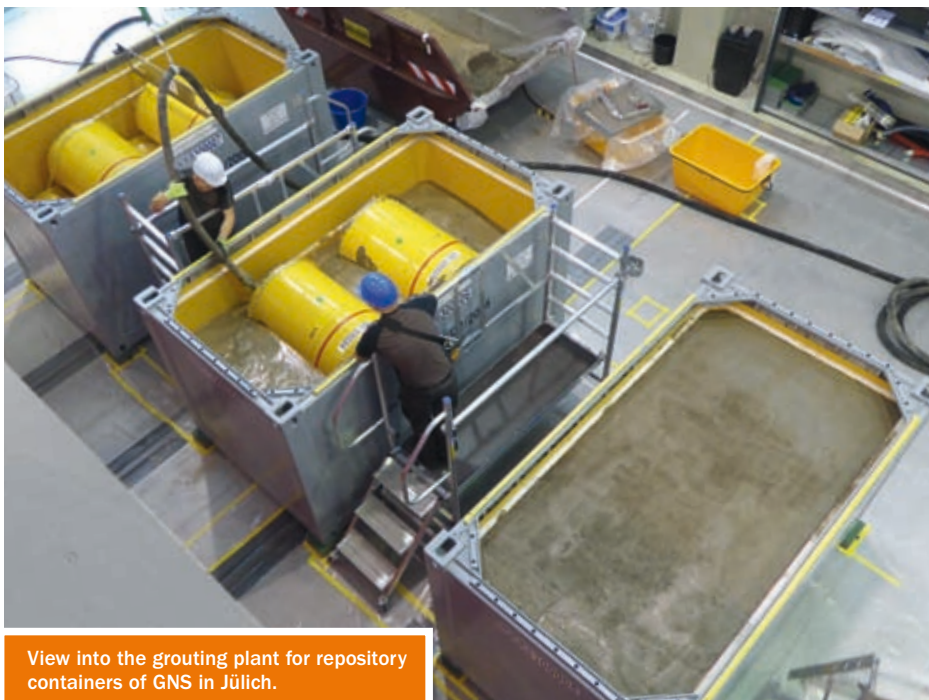
Last year, RWE Nuclear ordered 47 CASTOR® V casks for the Gundrem-

mingen nuclear power plant – a so-called “End of Life” contract, as it leads to the complete defueling of the nuclear power plant. Delivery of the CASTOR® V/52 type casks is scheduled for between 2021 and 2025. “The CASTOR® V/52 is able to cover our wide range of spent fuel assemblies reliably and predictably with a single cask solution”, explains Dr. Heiko Ringel, manager of the Gundremmingen nuclear power plant. “The CASTOR® casks now ordered cover all our remaining needs in Gundremmingen and, when their loading is complete, our two power plant units will be fuel-free.”

## Grouting method for containers qualified

# Grouting by GNS

In order to produce packages suitable for final disposal in the German final repository Konrad, containers filled with certain waste categories have to be grouted according to the final disposal conditions. After six years of intensive development work, GNS was able to complete the qualification of the concreting process and start serial application.



View into the grouting plant for repository containers of GNS in Jülich.

“For the conditioning by GNS or a nuclear power plant, grouting concrete, for example, is used for dimensionally stable fixation, load securing, thermal shielding or even just for residual cavity filling”, explains Dr. Martin Berthold, who is responsible for the development and implementation of the process at GNS. “This is based on specifications from the cask qualification for the Konrad final repository via the test certificate or from campaign-specific approaches.” For this purpose, GNS together with partners qualified the materials at the Bundesgesellschaft für Endlagerung mbH (BGE) and proved the handling and process-safe processing by

means of a GNS work instruction. The successful development and qualification of the concrete specifications and the corresponding grouting process was accompanied in close cooperation with Baumaschinen Beckschulte KG as an experienced specialist for concrete processing and with Kiwa GmbH as a technology and materials specialist. GNS has had itself qualified as a concrete manufacturer, certified the machine technology and installed an external monitoring system. This means that the now available concrete materials – a normal and a lightweight concrete – can be processed and used to grout Konrad containers.

### Both stationary and mobile

In October 2019, the first three Konrad containers (KC) were grouted at the GNS facility in Jülich with the stationary plant for the grouting of repository casks (AVEC). The first-time use of GNS’s own mobile grouting unit in a nuclear power plant immediately followed at Stade NPP. In just four weeks, a total of 15 KC of different types were filled with concrete in weekly batches of four and finally three KC. Based on this experience, the implementation of the qualification approach for the materials at the Federal Company for Radioactive Waste Disposal (BGE) and the procedure according to a superordinate quality management plan of GNS could be demonstrated.

Now, the order backlog of currently roughly 400 additional casks can be tackled. The next campaign in Biblis with around 50 containers has already started.



Concreting with hold-down device.

CASTOR® geo32CH

# First Approval Applied for in Switzerland

In 2027, the first of 51 CASTOR® geo32CH is to be loaded at the Swiss Gösgen nuclear power plant (KKG). The Swiss safety authority ENSI has begun the initial approval process for the newly developed series.

For the first time, GNS prepared an Integrated Safety Case (ISC), a safety analysis report that combines the proofs required under traffic and storage regulations. GNS then submitted the traffic regulation part to ENSI, while KKG as the

subsequent cask owner submitted the storage regulation part. The procedure also includes missile and a drop tests. The fabrication of the casks will begin following the procedure of approval that will take around four years.



## Audits

# GNS on the Test Bench

In addition to the ASME certification (see article on page 6), various other audits were scheduled for GNS in 2019. All were successfully passed.

The management system according to KTA 1401 of GNS was audited by VGB and PreussenElektra and recertified for another three years. GNS also underwent the annual TÜV audit: The management systems according to DIN EN ISO 9001:2015 and DIN EN ISO 14001:2015 were put to the test by TÜV Rheinland. The environmental management system was successfully recertified and the QM system was repeatedly monitored. An energy audit was also carried out at GNS on the basis of DIN EN 16247-1.

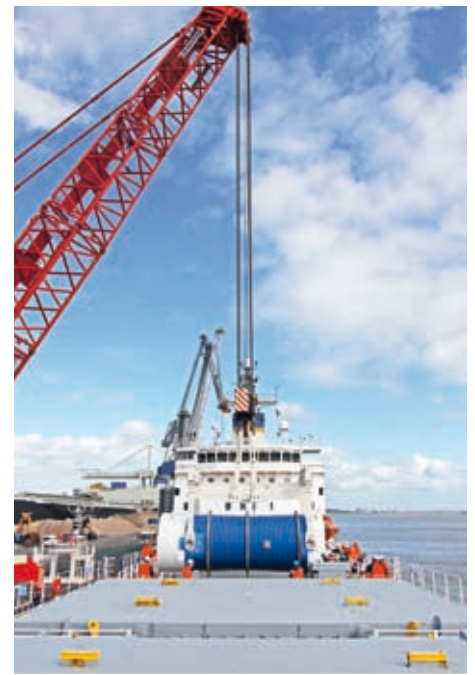
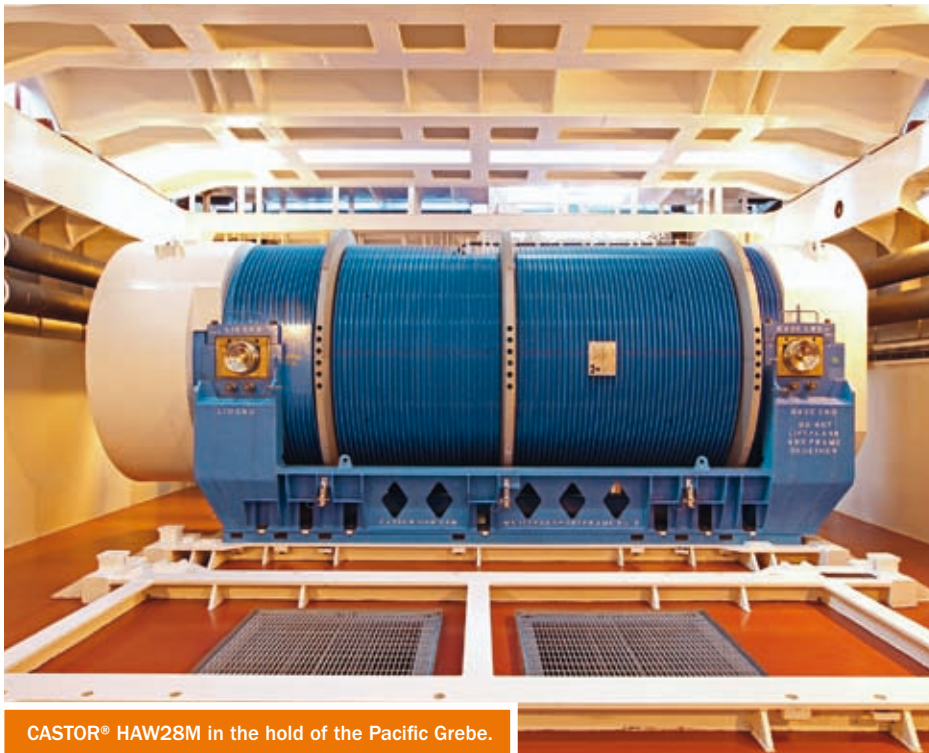
In order to verify the awarding of the “Safe with System” quality seal by the German Social Accident Insurance Institution for the raw materials and chemical industry (Berufsgenossenschaft Rohstoffe und chemische Erzeugnisse – BG RCI) for the next three years, the facilities in Essen, Mülheim and the GNS office in Alzenau were audited. In addition to checking the quality seal of the BG RCI, the assessment according to the new DIN ISO 45001:2018 was part of the audit.



Repatriation of reprocessing waste

# Corona Virus Delays Transport Program

In spring of 2020, GNS – on behalf of the German nuclear power plant operators – planned the first of three repatriation transports of high-level radioactive waste from the reprocessing of German fuel elements at Sellafield in England. However, due to the spread of the COVID-19 pandemic, the transport was temporarily suspended.



Until 2005, spent fuel elements from the operation of German nuclear power plants were brought to Great Britain and France for reprocessing. The radioactive waste produced during reprocessing must be taken back to Germany. GNS is commissioned by the German nuclear power plant operators to prepare and implement the return of this waste to German interim storage facilities. Between 1996 and 2011, GNS carried out twelve transports with

a total of 108 casks with vitrified high-level waste from the reprocessing of German fuel assemblies in the French reprocessing plant in La Hague to the central interim storage facility in Gorleben in Lower Saxony.

#### **On-site instead of centralized storage**

Originally, the remaining vitrified waste still to be returned from reprocessing was also to be stored in Gorleben until

a suitable final repository is available. As part of restarting the search for a final repository in Germany, however, it was determined that no further vitrified reprocessing waste should be brought to Gorleben. Based on a concept of the Federal Ministry for the Environment, a broad political consensus was reached in 2015 that the remaining waste from Sellafield, a total of 20 CASTOR® casks, should instead be stored at the nuclear power plant

sites Biblis in Hesse, Isar in Bavaria and Brokdorf in Schleswig-Holstein. The last vitrified intermediate-level reprocessing waste from La Hague will be stored in five CASTOR® casks in Philippsburg. These four on-site interim storage facilities have meanwhile all become the property of the Federal Government and are operated by federally-owned BGZ Gesellschaft für Zwischenlagerung mbH.

#### Four transports to four locations

The first transport with six CASTOR® HAW28M casks was scheduled to go to Biblis in spring 2020. After that, five casks of the same type are to be brought from La Hague to Philippsburg. The remaining casks from Sellafield are then to be transported in two separate transports, each with seven CASTOR® HAW28M casks, to Isar and Brokdorf. The sequence in which this will take place has not yet been determined.

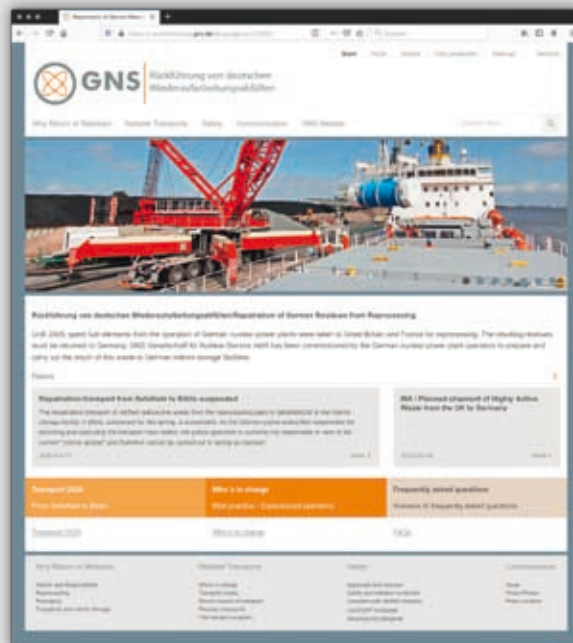
The BGZ had received the licence according to § 6 of the German Atomic Energy Act (AtG) for the emplacement of the casks in Biblis shortly before Christmas 2019, the licence required for the transport according to § 4 German Atomic Energy Act (AtG) was granted by the Federal Office for the Safety of Nuclear Waste Management (BASE) on 14th February 2020. The preparations that had been carried out together with several partner companies for many months were complete. The six casks were loaded, ready for transport and were to be taken by rail

to the English port. There, the ship – the Pacific Grebe of the INS – was waiting for the voyage to a German seaport where the casks would have been reloaded onto railway wagons for the last leg to Biblis. Then, however, the police authorities responsible for escorting and executing the transport in Germany announced on 13th March 2020 that the police operation to secure the transport was not justifiable in view of the increasing “spread of the corona virus”, and the return transport had to be suspended at short notice.

#### Postponed is not cancelled

It is still uncertain today when the repatriation programme can be continued. The obligation to take back the waste to Germany, of course, continues to apply. The companies and institutions involved in the repatriation will agree in due course on a new time window for the transport to Biblis as well as for the other three transports.

## GNS Information Portal on Repatriation



GNS has compiled comprehensive information on the repatriation of German reprocessing waste and the upcoming transports on a special website. Here, further background information, photos and graphics can be found as well as contact persons of the participating companies.

[rueckfuehrung.gns.de](http://rueckfuehrung.gns.de)

Waste minimisation and radiation protection always in the foreground

# Duisburg Site: Decommissioning under own Direction Concluded

A major chapter in the history of waste disposal has been concluded: On 31st March 2020, GNS completely vacated its previous premises in Duisburg-Wanheim, thus ending its activities at the site after 35 years. Within three years and supported by employees of long-standing partner companies, the GNS operating team dismantled all the facilities installed over the years for the treatment of radioactive waste, processed the resulting material flows itself and fed them into the various disposal paths. Finally, the entire radiation protection area, about 11,000 m<sup>2</sup> of the 29,000 m<sup>2</sup> site, was comprehensively cleared. As a result, GNS was able to return the licence for handling radioactive substances under radiation protection law in mid-March 2020. This returns the site for conventional use again.



Hall 1 during the operating phase with the caissons and after complete clearance.



Hall 2 (top) and Hall 3.2 (bottom) during the operating phase and after complete clearance.

At the end of 2013, GNS had announced its decision to close the plant in Duisburg-Wanheim. Operated since 1985 in halls that are now more than 100 years old, the capacities of the facility had been expanded just a few years earlier with investments in the double-digit million range for the upcoming lifetime extensions of the German NPPs and preparations for the commissioning of the Konrad final repository. But, after the phase-out decision in 2011, the situation on the waste management market had changed radically: “The gradual shut-down of the German nuclear power plants meant that the quantity of operational waste, as it was processed in the Duisburg facility of GNS, irreversibly declined”, explains Dr. Holger Spann, as GNS division manager for residues and waste also responsible for the Duisburg facility. “At the same time, new capacities for processing local decommissioning waste were created at the power plant sites.”

### The Duisburg withdrawal timetable

The rough timetable for the withdrawal was set in summer 2014: The routine processing of the waste of GNS customers was to continue until the spring of 2017. Then, in just under three years, the facilities were to be completely dismantled and cleared by the company’s own staff in order to return the licence for handling radioactive substances to the authorities and the industrial premises to the landlord.

The GNS team in Duisburg benefitted from its many years of experience in the treatment of customers’ decommissioning waste. This is because since the phase-out decision, it has become difficult to find competent personnel for dismantling in Germany.

### Waste prevention through recycling and recovery

André Henning, a long-standing employee of GNS in Duisburg and as

plant manager responsible during the decommissioning: “Even during regular operations in Duisburg, the avoidance of radioactive waste that requires costly disposal through clever processing, sorting, recycling or free release was the most economical and environmentally friendly disposal solution. This applied all the more so when dismantling our own plant.” But the proven GNS technology was by no means “scrap iron”. The FAKIR VIII hydraulic supercompactor and the PETRA drying facility are used in Biblis. Installed in just the last few years of operation for loading and grouting Konrad containers, the plant technology is now in place in Philippsburg as is the measurement system for free release, while the blasting cabin was relocated to the GNS plant in Mülheim.

After dismantling and removal of the plant technology, the disassembly of the permanently installed “caissons” was on the agenda. Only in these “halls within the hall”, equipped with their own ventilation and filter technology, was open handling of radioactive materials permitted and the various manual and automatic processing steps took place. In addition, the laboratory and the other hall areas had to be cleared and then cleaned.

André Henning summarises: “In total, we were able to recycle more than 80 percent of the approximately 3,200 tons of materials that were accumulated during the decommissioning or recover them for active or inactive reuse. 14 percent of the material could still be released at the site and only 4 percent had to be disposed of as radioactive waste.”

### Continuous monitoring by the authorities

“The early and permanent inclusion of the authorities involved proved



Shortly before the return of the plant: The core dismantling team around the plant manager responsible during dismantling, André Henning (4th from left).

to be particularly helpful”, summarises Souad Pederzani, GNS project manager of the decommissioning project. Besides the nuclear regulatory authority, these were the authorities for occupational health and safety and construction site safety as well as the responsible trade associations. In the course of the withdrawal, regular status meetings were held in addition to the normal supervisory inspections to transparently present the work done and the next steps envisaged. “This assured the flow of information and enabled rapid decisions even in the event of unforeseen events that are unavoidable in such a major project”, Pederzani is convinced. “Another positive contribution was the continuity and in-depth knowledge of the operating history on the part of the authorities.”

A particular challenge was the not always reliable database of the building structure. Although the documents on the installations and ventilation systems brought in by GNS were complete, there were however gaps and uncertainties with regard to various earlier renovation works. It was unclear, for example, what was the course of any sewage pipes under the caissons

or the construction and extension of the floors, pits and foundations.

The removal of conventional pollutants from previous use required not only unexpected disposal measures, but also additional occupational health and safety planning as well as equipment, personnel qualification and coordination with nuclear law and occupational safety supervisory authorities.

#### **Mission accomplished**

Despite the various imponderables that such an extensive decommissioning project in buildings more than 100 years old entails, the timetable set in 2014 was virtually maintained: By the end of 2019, the dismantling measures had been largely completed, the absence of contamination of the entire property could be proven to the supervisory authority with the confirmation of the Dortmund Materials Testing Office as the commissioned expert, and the Düsseldorf District Government issued the confirming notice on 10th March 2020. As a result, GNS returned the radiation protection licence for handling radioactive substances on 19th March 2020. Punctually, on 31st March 2020,

the time had come: The entire buildings and premises were returned to the landlord for further industrial use. The last staff of the Duisburg facility will now be deployed at other GNS sites.

GNS Managing Director Dr. Hannes Wimmer thanked all those involved on the occasion of the return of the vacated premises: “This tour de force was only made possible by the intensive cooperation between the experienced employees of our facility and the company strengths of iUS, Studsvik, SAT Kerntechnik, Hoffmeier and Tecubel. We would like to express our very special thanks to all of them for their joint efforts during this unique decommissioning project!”



Aerial view of the former GNS facility in Duisburg-Wanheim.



GNS supplies conditioning facilities for the power plant sites

# Plant Technology for Decommissioning

For more than thirty years GNS has been designing and operating both mobile and stationary conditioning facilities for waste from the operation of nuclear power plants. Hydraulic supercompactors and vacuum drying facilities have always been among the most frequently used equipment. As part of the preparation for decommissioning, the demand for conditioning facilities for low- and intermediate-level radioactive waste is increasing significantly, especially on the German market. Recently, the filling stations for Konrad containers have also been in particular demand.



Assembly and testing of a drying facility at the GNS plant in Mülheim.



3D concept of a loading station for Konrad containers.

With the experience of more than thirty years in the development, fabrication and operation of conditioning facilities, GNS was recently able to impress with innovative concepts in further tendering procedures. The order books currently include numerous drying chamber facilities and in-drum dryers for the PreussenElektra sites in Unterweser and Grafenrheinfeld, among others. In addition, GNS is currently contracted to supply loading stations for Konrad containers where the casks are loaded according to specification and their

remaining volumes are then filled. In the first quarter of 2020, GNS was also able for the first time to win a contract for plant engineering together with Höfer & Bechtel: An in-drum dryer for evaporator concentrate for Grafenrheinfeld NPP. Including the orders already being processed, the order volume for conditioning technology is currently more than EUR 10 million.

All plants are designed, assembled and tested by GNS or Höfer & Bechtel and then installed and commissioned at the

customer's site. In order to continue to succeed in the strongly cost-driven market for plant engineering and equipment, especially in the international environment, the GNS department responsible for handling projects and orders relating to plant engineering and cask equipment underwent structural adjustments last year and established a separate group for mechanical construction. In addition, Höfer & Bechtel will now carry out the electrical engineering, which had been outsourced, internally within the company.

Company anniversary of WTI GmbH

# One Step Ahead for Forty Years

For almost three decades, WTI Wissenschaftlich-Technische Ingenieurberatung GmbH has been an affiliated company of GNS and, for 15 years, it has been a full member of the GNS Group. Even forty years after their foundation in May 1980 by Dr. Heinz Geiser, however, the specialists for nuclear engineering services from Jülich have not only maintained their special position in the industry, but have also expanded it sustainably.



In front of WTI in Jülich: Birgitt Sentis (Commercial Director), Dr. Hannes Wimmer (Managing Director) and Roger Vallentin (Technical Director). A group photo of the entire WTI staff was unfortunately not possible during Corona times.



Left: Report on the new construction plans of WTI in 1993. Right: Snapshots of the first relocation in 1982 from the private house of Dr. Heinz Geiser (middle) to the new offices in the same town (top).

In the course of the development of nuclear power plant capacities in Germany in the 1970s, the nuclear industry also picked up speed. Based on his experience as a physicist in an engineering company, dealing with core design and safety analyses in nuclear power plant construction, Dr. Heinz Geiser, then 33 years old, started his “Scientific-Technical Engineering Consultancy” in August 1979 in the basement of his home, initially as a one-man business.

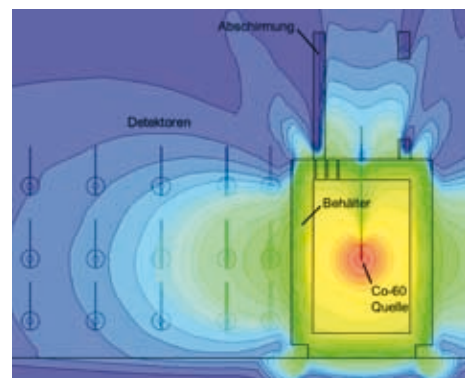
Already in the following spring, the WTI Wissenschaftlich-Technische Ingenieurberatung GmbH was founded, which officially started operation on 6th May 1980 when it was entered in the commercial register. Besides the two partners Dr. Heinz Geiser and Dr. Wolfgang Weyer, the first four employees were Konrad Dreesen, Gert Gestermann, Johann Klöckner and Rudolf Printz. The following is listed as the object of the business in the business registration in the municipality of

Titz: “Provision of engineering services in the field of studies and surveys.” The same address is given for the registered office of the management as well as the place of business of the newly founded WTI GmbH as for the place of residence of the managing director Dr. Heinz Geiser. “From the very beginning, we supported GNS in the development of their CASTOR® casks with our shielding calculations and, a little later, also in the construction of waste treatment technology such as hydraulic supercompactors and vacuum drying”, Dr. Geiser today remembers the early years of WTI. “In the development of thick-walled waste packagings such as the MOSAIK® casks, shielding calculations were then again obligatory.”

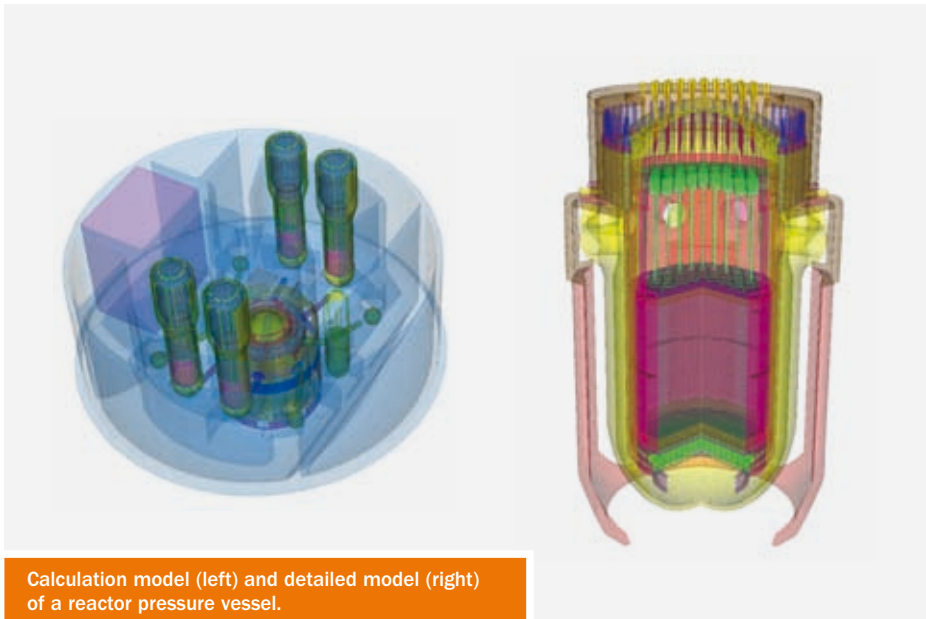
Konrad Dreesen, today Divisional Director Cask Services at GNS, looks back: “We actually started back then in the basement of Heinz Geiser’s private house. Nowadays you would probably call something like this a

“start-up” but, for us, there was more than enough to do already from day one!”

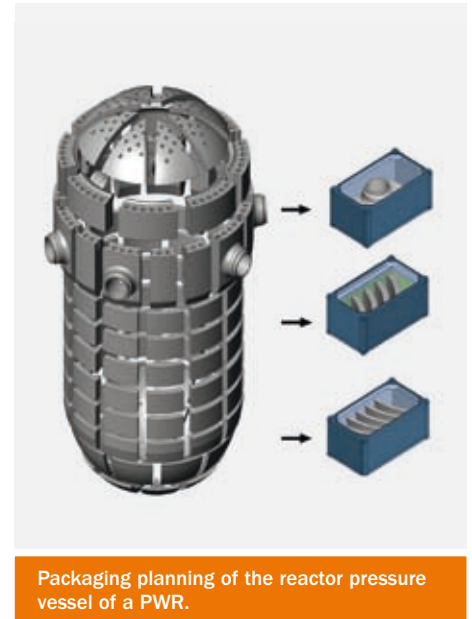
The specialisation in problem solutions for all aspects of waste management has proven to be extremely sustainable for the development of WTI to this day, as has the extremely favourable location. And even the first contacts with GNS had lasting effects on the positioning of WTI. Roger Vallentin,



Calculated dose rate distribution on the MOSAIK® II-15.



Calculation model (left) and detailed model (right) of a reactor pressure vessel.



Packaging planning of the reactor pressure vessel of a PWR.

Authorised Signatory and Technical Director of WTI: “Apart from the excellent personnel through the university and research environment Cologne-Aachen-Jülich, one of the particular success factors was access to the then exclusive American computer programs. We were able to use them on behalf of FZJ and GNS within the scope of the approval procedure for storage in the USA for the CASTOR® MTR as well as for the CASTOR® V/21 and the X/33 for Virginia Power and that we still use today as part of the loading planning. Back then, 35 years ago, the mainframe computer at the Research Centre Jülich was needed for this purpose. Today, a coupling of powerful PCs is sufficient!”

### Entry of GNS

“The development of WTI is closely linked to the development of GNS that is just two years older”, recalled Dr. Heinz Geiser on the occasion of the 30th anniversary of the founding of WTI. “It was therefore only logical to also seek to bind both companies under company law.” And so, in 1991, GNS initially took over 40 percent

of the shares in WTI, whose now 36 employees with their offices were housed in four neighbouring detached houses.

In the same year, WTI engineers started planning the Interim Storage Facility North (Zwischenlager Nord or ZLN) at the site of the former East German Greifswald nuclear power plant that is still the largest German interim storage complex with capacities for high-level radioactive waste and irradiated fuel assemblies as well as for low- and intermediate-level radioactive waste from decommissioning on a total storage area of 20,000 m<sup>2</sup>.

### The WTI concept

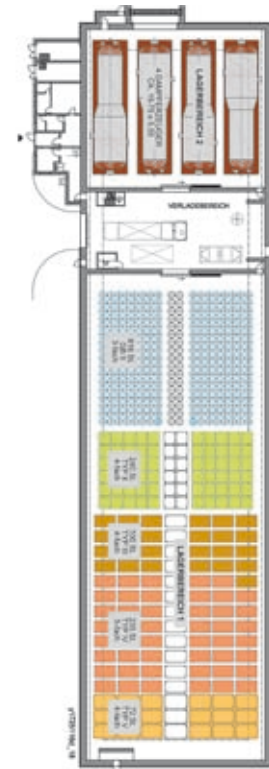
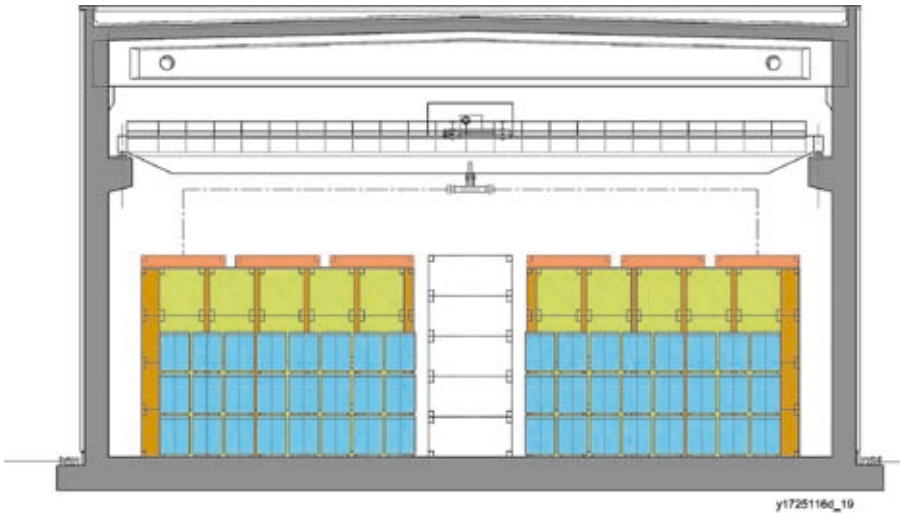
“We like to refer to the ZLN as the mother of all spent fuel and waste storage facilities designed by WTI as, to this day, the main planning features of the ZLN – such as the basic hall layout with one overhead crane per hall and a common loading area for all halls – are still incorporated in all our storage projects”, explains Dr. Hannes Wimmer, Managing Director of GNS and WTI. The big moment for

WTI came in the early 2000s: As a result of the ban on the transport of irradiated fuel assemblies, German nuclear power plant operators had to establish storage capacities at their power plant sites. Based on the principles developed for the ZLN, WTI designed the on-site interim storage



Tunnel storage facility in Neckarwestheim. Photo: EnBW

facilities in Biblis, Grafenrheinfeld, Gundremmingen, Isar and Philippsburg and supervised their construction. In addition, WTI played a major role in the construction of the tunnel storage facility in Neckarwestheim, which is unique in the world.



Section and floor plan of a storage building designed by WTI.

### Comprehensive disposal competence

Besides storage planning, WTI also supports the operators of nuclear facilities in waste management in conjunction with GNS and is involved in almost all German decommissioning projects. For this purpose, WTI offers engineering services ranging from packaging planning for radioactive waste to documentation for interim storage and final disposal. WTI develops concepts, technical solutions and safety analyses for decommissioning projects and prepares application documents for submission to experts and authorities.

And WTI is always involved in all major GNS projects: in dismantling projects such as ZerKon and ReaDi (see page 8/9), on activity determinations and the cutting and packaging planning derived from them, etc., as well as in new cask developments such as the CASTOR® geo family still on the basis of shielding and criticality calculations.

“Since GNS joined the company in 1991, WTI has almost doubled in size”, says Birgitt Sentis, Authorised Signatory and Commercial Director of WTI. “Today, WTI

has around 70 employees and therefore has an interdisciplinary team of experienced scientists and engineers.” In order to create space and to finally have the workforce under one roof, WTI moved into its then newly constructed office building at the present company headquarters in Jülich as early as 1994.

### Training and research always a priority

The strategic partnership with the neighbouring FZJ Jülich provides access to scientific resources and infrastructure facilities. There is also a lively exchange with the universities in the region. “To date, we have supported more than 100 degree, bachelor, master and doctoral theses”, sums up Birgitt Sentis. “And we were able to retain many of the graduates in this way and take them on as permanent employees, some of whom are still working as experts at WTI today.” To date, WTI has enabled more than 30 commercial and technical trainees to start their careers.

### The challenge of generation change

Over the years, GNS and WTI have grown ever closer on a wide range of

projects. In 2005, GNS also acquired the remaining shares of WTI. At the same time, Dr. Heinz Geiser became a member of the GNS management board. After Dr. Geiser's retirement in 2011, Dr. Hannes Wimmer, Chairman of the GNS Executive Board, also took over the management of WTI on 1st January 2012. Dr. Wimmer: “A particular challenge in recent years has been to ensure that the generational change at WTI runs as smoothly as possible and without any loss of knowledge after the experts of the first hour have gradually gone into well-deserved retirement. The forward-looking training and personnel policy at WTI has more than proved its worth. And without the persevering motivation and dedication of all the WTI employees – who, in some projects today, still remind me of a buzzing start-up – the company's long-term success would not have been possible. My special thanks go to all of them, active and retired alike! Unfortunately, we also had to cancel our long-since planned anniversary works outing due to the pandemic situation – but here again: postponed is not cancelled!”

# Meetings and Conferences

In 2019, GNS was again represented internationally at meetings and conferences in Europe, Asia, Jordan and America.

## AMNT

50 years of “Annual Meeting on Nuclear Technology” were celebrated in 2019. At the “Anniversary Edition” of Germany’s annual conference on Nuclear Technology, the GNS Group was prominently represented with its central stand in the

industrial exhibition as well as various lectures. In addition to the success story “40 years of CASTOR®”, the programme included the radiological characterisation of large components and the first loading campaign with the GNS IQ® quiver system, as well as GNS products such as the CASTOR® geo family, the GNS

CLU system and the CASTOR® MTR3. GNS also participated in the Nuclear Energy Campus, an information event of the Young Generation of the German Nuclear Society (KTG) for interested pupils and students with its own station on the subject of disposal and final disposal.



Presentation of the Young Scientists Award 2019, sponsored by GNS and the Forschungsinstitut für Kerntechnik und Energieumwandlung e.V. Prof. Marco K. Koch (Ruhr University Bochum), Prof. Dr. Jörg Starflinger (University of Stuttgart), Bianca Schacherl (2nd prize, Karlsruhe Institute of Technology), Claudia Graß (1st prize, University of Stuttgart), Dr. Jürgen Skrzypek (GNS), Dr. Wolfgang Steinwarz, Dr. Katharina Stummeyer (GRS). Not in the picture: Third prize-winner Moritz Lönhoff (Technical University of Kaiserslautern).

## KONTEC

The GNS group contributed three lectures and two posters to the technical program of KONTEC 2019, topics also included

the withdrawal from Duisburg (see also page 22) and the transport of large components. In 2019, the GNS stand was again one of the central contact points at the trade exhibition and served

as a framework for numerous discussions between GNS and representatives of customers, the utilities, authorities and experts.

## International

GNS also presented itself with lectures at the European Research Reactor Conference (RRFM) in Jordan, the JAIF Annual Meeting in Tokyo/Japan, the European Nuclear Young Generation Forum in Gent/Belgium, the PATRAM in New Orleans/USA, the NDWM in London/UK and the Integrated Waste Management Conference in Penrith/UK.



Active GNS employees

# GNS on Foot and by Bike

It does not always have to be the “Ironman”: In 2019, many GNS employees were also active in sports on a smaller scale. A considerable improvement was achieved among the runners, and large teams started for the first time among the cyclists.



30 runners raced for GNS at the 9th Essen company run in 2019, a significant increase over the previous year. Instead of an overall team classification, this year the results of three runners each were added together. The best GNS teams made it into the TOP 100 in the women’s category with place 59 and in the men’s category with place 39. In the individual rankings, GNS employees finished 51st in the women’s race and 17th in the men’s race. A total of 11,000 participants from 534 companies ran the 5 kilometres from the city centre to the Grugapark.

Also in 2019 – this was the seventh time – a GNS team started in the Duisburg Lichterlauf. In the team ranking, GNS took fifth place out of 41 teams.

In the women’s age group 30 to 35 and the men’s age group 35 to 40, GNS employees took first and second place respectively. In order to replace injured runners, recruitment also took place within the family – five runners in GNS jerseys were able to take part in the race. Other colleagues provided moral support along the route.

## By bike to work and to Naples

Five teams of four people each took part in the “Cycle to work” campaign (“Mit dem Rad zur Arbeit” – MdRzA) for GNS. The campaign has already been taking place nationwide for 19 years and was initiated by the health insurance company AOK and the German National Cyclists’ Association ADFC. On

a total of 250 days, the members of the “GNS CASTOR” team came to the office by bike – and in the overall standings, they finished 497th out of over 13,000 teams. All GNS participants together rode about 10,000 km in three months in the “Cycle to work” campaign.

The distance from Essen to Naples was also cycled by ten GNS employees – at least as far as the number of kilometres covered together during the three-week city cycling event in 2019 was concerned. Since 2008, local politicians and citizens throughout Germany have been pedalling as part of the “Stadtradeln” campaign for more climate protection and bicycle traffic, which was launched by Climate Alliance. In Essen, a total of 558,104 km were covered by 1,907 cyclists. With 1,664 km, the GNS team “Die Hochaktiven” finished respectably in the middle (78th place of 140 teams).



GNS employee at the Ironman World Championship in Hawaii for the second time

# The GNS Ironman

3.8 km of swimming, 180 km of cycling and then 42.2 km of running – not exactly what you would normally expect from a relaxing holiday in Hawaii. But if you want to finish at the Ironman World Championship and become an “Ironman”, you have to conquer these distances.



In 2019, GNS employee Jan Seewald started for the second time in the long distance triathlon in Kailua-Kona, Hawaii. With an outstanding total time of 9.06 hours, he not only improved on 2017 by 20 minutes, but also outperformed many a professional. He finished 82nd in the overall standings,

74th in the men's field and 14th in his age group (35–39).

More than 2,400 participants competed in the 2019 Ironman World Championship, including 279 triathletes from Germany. 225 German men and 54 German women quali-

fied in different ways for the start in the Mecca of triathletes. Among the German participants, there was a high number of professionals: Six in the women's field and 13 in the men's field. Seewald was also excellently placed among the Germans: 17th German (9th excluding professionals).



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